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November 26, 1960
VOL. 78 NO. 22 PAGES 337-352

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

A Spotty Sun

See Page 339

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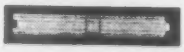

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GEOPHYSICS

Solar Storm Affects Radar

The most severe magnetic storm in a decade disrupted international communications and interfered with radar detection of missiles.

See Front Cover

➤ A GIANT SOLAR STORM disrupted international communications and interfered with radar detection of missiles.

Even if the storm's results did not affect certain radars, long-distance communication of what a radar screen shows is seriously impaired, or even cut off, when the sun hurls high-energy particles earthward.

Such disruption is worse at the high latitudes near the arctic circle where the radar screens that form the core of the United States early warning system are located.

Any detection system working at high frequencies or using the lower part of the very high frequency spectrum, up to about 30 or 40 megacycles, would be affected by a large solar storm.

The particles causing a magnetic storm and a blackout of radio communications are protons (the cores, or nuclei, of hydrogen atoms) thrown out by giant flares from a solar sunspot.

The mid-November magnetic storm was the most severe in a decade. The huge sunspots, from which erupted the solar flares causing the magnetic storm, can be seen on the cover of this week's SCIENCE NEWS LETTER.

The spots travel across the sun's surface from east to west (left to right) as the sun rotates. The photograph was taken on Nov. 14 by astronomer Irving W. Lindenblad with the 30-foot photoheliograph of the U. S. Naval Observatory, Washington, D. C.

Not only are long-distance shortwave communications seriously upset following large solar storms, but the orbital time of all satellites within about 300 miles of earth is slowed, due to expansion of the earth's atmosphere.

Scientists believe that the following events occur when giant sunspots erupt on the sun:

Clouds of ionized particles, mostly protons, speeding spaceward from the sun are trapped in the earth's magnetic field. (Ionized particles are atoms stripped of electrons.) Electrons may also be present in such clouds, but they are very difficult to detect because their effects are so very much smaller.

The particles are guided to two belts of the earth's high atmosphere by the magnetic field, one belt about 23 degrees from the North Pole and one the same distance from the South Pole.

The high-speed incoming particles are believed to fill up the Van Allen belts, the earth's natural radiation regions hundreds of miles up encircling the earth beyond the ionosphere. These then overflow and spill their contents earthward, resulting in auroras.

Instruments in satellites and studies of their motions are helping scientists build up a better picture of the interactions between solar particles and the earth's magnetic field.

• Science News Letter, 78:339 November 26, 1960

METEOROLOGY

"EPHI" Tracks Lightning, Hurricanes, Tornadoes

➤ A NEW TOOL that can pick up static from lightning storms, tornadoes and hurricanes with greater accuracy has been developed at the National Bureau of Standards' Boulder Laboratories, Boulder, Colo.

The system, named "Ephi," consists of three 125-foot antenna towers, four miles apart, and a central control station, located in an old schoolhouse near Brighton, Colo.

The three antenna poles form a triangle, and when a storm occurs, the sferic, or static, radio signals reach each antenna at a slightly different time, except when a storm occurs at the exact center of the triangle.

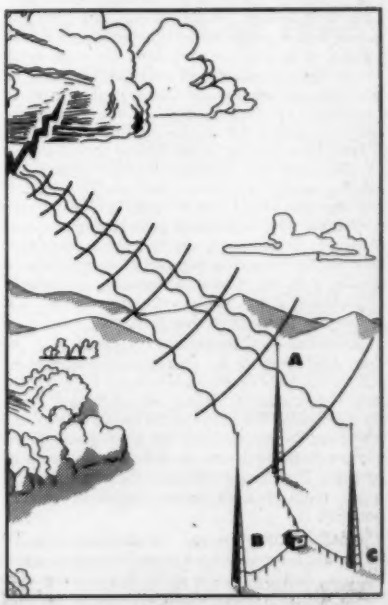
From the antennas the signals are sent to the central control station where electronic equipment determines the direction to the lightning source.

Ephi can also count the number of static signals arriving from several different directions at the same time.

In addition, the sferic waveform of an oscilloscope can be photographed either with still or movie cameras for studies aimed at a better understanding of radio wave propagation and the nature of lightning.

For tracking tornadoes and hurricanes, two stations like the one just installed could determine the position of a storm at distances of many hundreds of miles from either station.

• Science News Letter, 78:339 November 26, 1960



"EPHI" TRACKS A STORM

ASTRONOMY

"Tourist" Maps of Moon

➤ FRENCH ASTRONOMERS, working with English specialists, are planning to make a "tourist" map of the moon, in order to supply astronauts who land on the earth's satellite with a detailed guide.

A complete new set of moon photographs will be taken to make up this selenographic map, because the scale of existing pictures is too small.

In addition, existing photographs do not fit together very well, since most of them have been taken by individual and isolated photographers.

The new photographs will be taken at the observatory on the Pic du Midi de Bigorre, in the Pyrenees.

The final map of the entire moon will have the form of a circle 11.8 feet in diameter, which will be divided into sheets for more convenient handling.

Extraordinary photographs of Mars, taken from the Pic du Midi by astronomers with a 15-inch lens, have shown what can be done.

The unusual quality of the Mars photographs was due to the method of using superimposed pictures snapped at short intervals.

In this way it was possible to eliminate the difficulties caused by the earth's atmosphere, which varies from one instant to the next.

A new telescope under construction for the moon study will be 39.4 inches in diameter. It will be capable of magnifying objects 1,500 times and will, optically speaking, bring the moon to a distance of 155 miles from the earth, making it possible to pick out objects measuring 1,000 feet.

About a hundred large-scale photographs will be needed to cover the whole moon. Several photographs will be made of the same area, using different lighting to take advantage of the oblique light that throws objects into relief.

From these photographs, map-makers will put together a detailed map. To indicate the relief, the modern system of "level curves" will be used. These will be so precise that, if desired, they could be used for the building of dams on the moon.

• Science News Letter, 78:339 November 26, 1960

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

Agricultura.—Micre radiodiffusores es usate experimentalmente pro establir e mantener contacto inter le fermeros individual de Australia e lor numerose greges de oves. Le population ovin de Australia amonta a cento milliones capites. Le greges—oves nunquam quita le grege—erra liberemente a transverso le vaste pasturas de ille insula continente, a per consequente lor retrovation es frequentemente difficile. Tamen, in le futuro il pare que iste problema va devenir minus spinose. Radiodiffusores, portate per le oves ductor del varie greges, va emitter signales periodic que le fermero pote reciper e usar in locar su animales al tempore del tonsion e de altere necessitates.

Ornithologia.—Aves de species insectivore es incommode a mantener in captivitate a causa del enoio de semper deber provider adequate quantitates de insectos. Tamen, al laboratorio ornithologic del Universitate Cornell on ha trovate que in loco de insectos tal aves accepta larvas de ape (que es facile a obtener e etiam a preservar). Ecce un area de collaboration inter le avi- e le apicultura.

Astronautica.—Le programma astronautic del Statos Unite include le projecto de lancear in 1968 un dirigibile astronave circumlunar con tres passageros.

Statistica Dental.—Le population del Statos Unite possede collectivemente circa 700,000,000 non-tractate (non-plenate) cavitates dental, i.e. circa quatro per bucca individual.

Inventiones.—Un horologio esseva inventate in que micre ballas migra ab un cifra al altere pro indicar le tempore. Le horologio ha nulle agulias o—plus tosto—nulle agulias visibile. De facto, agulias conventional es presente, sed illos se trova al reverso del quadrante. Lor punctas es magnetic, e isto causa e explica le movimento del ballas.

Technologia Medical.—Le tension de sanguine intra le cerebro pote esser mesurate (indirectemente) per medio de un apparato perfectionate per Dr. M. Thorner del Universitate Pennsylvania. Le apparato va esser cognoscite como le Pulsensor Thorner. Illo profita del facto que le tension cerebro-sanguinee es identic con le tension in le arteria ophthalmic (le qual es le sol branca del circulation cerebral que non es confinate al interior del cranio). Un par de cameras (o cuppas) es applicate hermeticamente contra le region del arteria ophthalmic a ambe lateres. Illos contine sensibilissime transductores de ionisation que converte le fluctuationes del tension ophthalmo-arterial in signales audibile. Iste signales cessa si tosto que le pression atmospheric intra le cameras es augmentate usque al puncto de equalitate con le tension del pulsos arterial. On mesura le pression e sape que illo es identic con le tension sanguinee del arteria ophthalmic e assi del circulation cerebral. Le manovra require circa duo minutas.

Recercas de Cancere.—Es reportate ab London, Anglaterra, le uso de radioactive silicato de yttrium in loco de radioactive auro in le tractamento de cancerose fluidos intrapulmonar e intra-abdominal. Le prime experientias es promittente, sed le superioritate del nove methodo in comparation con le uso de auro non concerne le patiente. Il se tracta solmente del facto que yttrium radioactive es minus periculose pro le personal.

Antibioticos.—Le uso de antibioticos in le preservation de alimentos es multo minus commun in Anglaterra que in le Statos Unite. Le ration non es a vider in un attitude de opposition contra le methodo del parte del population anglese sed simplemente in le facto que solmente 19 pro cento del menages de Anglaterra possede installationes refrigeratori. Antibioticos sin refrigeration non protege le alimentos contra le decomposition microbial.

Terminologia Technic.—Nota Dr. W. A. van Bergiijk del Laboratorios Bell Telephone que le litteratura concernite con machinas que exerce temporarimente le functiones de organos del corpore suffre del facto que in parlar de renes e pulmones e altere entitates artificial, le autores tende a omitter le adjectivo in le curso de lor discussion, con le resultato que le lector in multe casos deveni confuse proque ille non sape si un termino particular designa un organo o un mechanismo. Dr. van Bergeijk propone le uso del suffixo '-mimo' pro le machinas in question. Un nephromimo, per exemplo, esserea alora un ren artificial. Le mesme suffixo poterea etiam esser usate pro designar un modello mathematic de non importa qual organo del corpore.

Aviation.—Un nove typo de paracadita es usabile a basse altitudes. Illo es propellite explosivemente in alto e etiam se displica per un action explosive. Su descendita es conventional.

Recercas de Cancere.—Le question si le incidentia de leucemia es elevate inter infantes ab matres subjicite a roentgenographia abdominal durante lor pregnantia recipeva duo annos retro un responsa affirmative in le publication de un studio per Dr. Alice M. Stewart del Universitate Oxford in Anglaterra. Un responsa negative es derivate per Drs. W. M. Court Brown e R. Doll de Edinburgh, Scotia, ab un studio de 12 annos concernente 39.166 casos. In iste material le incidentia de leucemia esseva de facto levemente inferior a illo que vale pro le population general.

Astronautica.—Investigatores al Universitate California ha trovate in experimentos con muses que le incidentia de malformationes cardiovascular cresce frappantemente in le prole ab matres que respirava, durante le pregnantia, un aere a reducite contento de oxygeno. Iste effecto esseva notate mesmo quando le provision de oxygeno esseva totalmente adequate pro le matres mesme. Si le situation es simile pro humanos, futur colonistas feminin in le luna va deber retornar in terra si tosto que ilas deveni pregnante.

Hematologia.—Esseva trovate per tres recercatores in Chicago que le transfusion de sanguine ab restablite victimas de arditura es benefic pro patientes qui ha similemente suffrite ardituras sed qui es non ancora restablite. Isto debe significar que vulneres de arditura resulta in le liberation de un toxina a in le circulation e que le restablimento del patiente occasiona le formation de un antitoxina specific.

Physica.—Tornados a tremores de terra produce undas sonic que pote esser usate pro determinar lor sito o centro. Le undas pote haber alte intensitates, sed illos es semper de basse frequentia e ergo inaudibile. Illos es designate como undas infrasonic. Un division del Bureau de Standards statounitese se occupa de studios theoric e experimental in iste area depost plure annos. On ha installate un rete de microphonos receptori in le vicinitate de Washington. Si istos omnes recipe le mesme configuration de undas, le causa es a trovar in un phenomeno natural del typo de tornados o tremores de terra (o tempestas magnetic o disturbationes in le campo magnetic del terra). Pro calcular le loco de origine del undas on prende como base le differentias in tempore de lor arrivata in le sitos del varie microphonos.

GENERAL SCIENCE

Reading Interlingua

➤ YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you never had contact with any foreign language.

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MEDICINE

Cell Growth in Cancer

➤ THE CHANCES of curing cancer may hinge on the number of tumor cells capable of growth, the National Academy of Sciences meeting was told in Philadelphia.

Dr. Mortimer L. Mendelsohn of the University of Pennsylvania School of Medicine reported that the chances of curing a tumor at any particular dose of radiation are roughly proportional to the number of cells in the tumor capable of growth.

Chemical approaches to cancer treatment depend on cell reproduction. This means that only the proliferating, or multiplying, cells take up the "poison." A fraction of cells that are temporarily non-growing is immune to the effects of chemical agents.

Speaking on the "growth fraction," defined as the ratio of multiplying to total cells, Dr. Mendelsohn said that a reliable indication of cell division is the incorporation of thymidine into the nuclei of cells. The cells, which are labeled with radioactive tritium, can be identified on an autoradiograph.

The assumption that the tumor can be represented by only two cell populations may be an oversimplification, Dr. Mendelsohn said, and further studies will be needed to confirm the results.

Experiments with breast tumors in mice, however, show the "growth fraction" is reasonably stable in any one tumor between the second and ninth days after injection with tritium-labeled thymidine.

• Science News Letter, 78:341 November 26, 1960

Abnormal Leukemia Cells

➤ THE CAUSE of the malignant nature of one type of leukemia cells may be that one of the chromosomes is unusually small.

Drs. Peter C. Nowell, University of Pennsylvania, and David A. Hungerford, Institute for Cancer Research, both of Philadelphia, told the National Academy of Sciences meeting in Philadelphia that they found an abnormal chromosome in the leukemia cells of each of seven persons with chronic granulocytic leukemia. Apparently a portion had been lost from the small chromosome.

In two other types of human leukemia, acute granulocytic and acute childhood leukemia, they found no change. They said that if the fundamental abnormality in these diseases is in the chromosomes or in their parts, the change is too small to be seen without more refined methods.

The investigators said that no "such specific abnormality" had previously been demonstrated. Very recent improvements in their technique made possible the detailed study of the chromosomes of human blood and bone marrow cells necessary to find the abnormality.

Although it has long been suggested that the basic abnormality in tumor cells might be found in their chromosomes or component genes, this finding in chronic granulocytic leukemia is the first reported of a specific chromosome change associated with a particular type of cancer.

• Science News Letter, 78:341 November 26, 1960

AERONAUTICS

Fly 3 Times Sound Speed

➤ TRANSPORT AIRPLANES capable of carrying 150 passengers at two or three times the speed of sound are being designed by the Russians, two engineers from the Boeing Airplane Company reported.

If the United States is to maintain its present position as a leader in the manufacture of commercial aircraft, Government financial support of industrial research, development and hardware programs in supersonic aircraft must be assured, Lloyd Goodmanson and Lars G. Romberg said.

They spoke at an Air Force-Navy-Industry Propulsion Lubricants Conference in San Antonio, Tex., co-sponsored by Wright Air Development Division, Dayton, Ohio, and Southwest Research Institute at San Antonio.

Such aircraft would operate in the 2,000-mile-plus range, they said. They predicted that traffic in this range would increase by five times within the next decade. Such ships would fly at 60,000 to 80,000 feet. They would not require increased runway lengths since they would be powered by turbofans.

By 1970 such ships will be taking air travelers in five hours from New York to Cairo, a distance of more than 5,000 miles, about the same time a jet takes to go today from New York to San Francisco, the Boeing engineers predicted.

Such supersonic flights will have to be made largely above water and over sparsely populated areas because of sonic boom, which is hard on the eardrums but even harder on windows that may be broken, they said.

• Science News Letter, 78:341 November 26, 1960

TECHNOLOGY

Jet Engine From J-57 Used for Ground Power

➤ THE COMBINATION of aircraft power with an industrial need has resulted in harnessing a jet engine as a gas-powered turbine. The stationary power source is now pumping 600,000,000 cubic feet of natural gas a day.

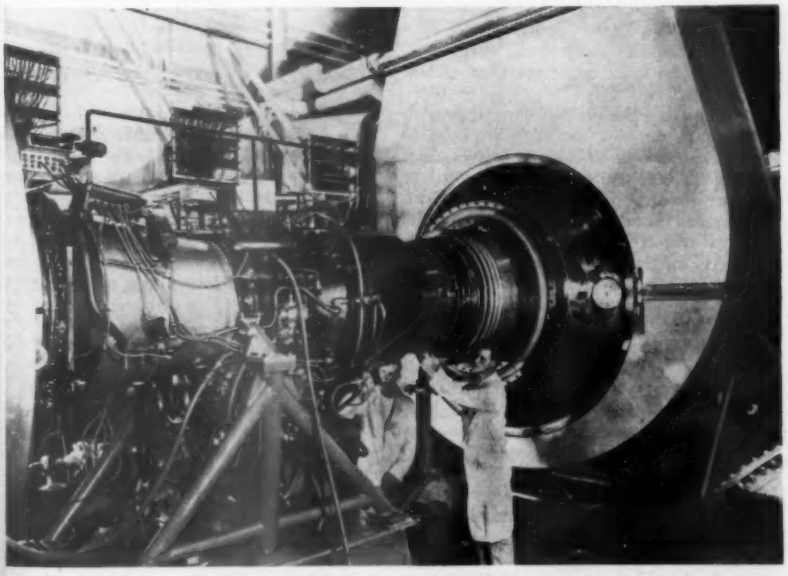
The advantage of the RT-248 gas turbine is that it provides tremendous power in a "small package."

A Pratt & Whitney Aircraft J-57 jet engine was adapted to run on natural gas in the RT-248 gas turbine, designed by The Cooper-Bessemer Corporation, Mount Vernon, Ohio.

The RT-248 is expected to find wide use in the natural gas, petroleum and petrochemical industries. A variation of this gas turbine is also expected to provide electric power, both for homes and industry, and to power ships. Plans for municipal electric plants with this gas turbine are now under study.

Less than four hours are needed to remove the jet engine section and replace it when necessary. Conventional engines require weeks of shutdown for overhaul.

• Science News Letter, 78:341 November 26, 1960



JET POWER FOR INDUSTRY AND HOMES—FIRST OF ITS KIND

BIOCHEMISTRY

Find Make-up of Molecule

➤ SCIENTISTS at the University of California's famed Virus Laboratory have scored again, this time by determining the exact sequence in which amino acid units are chained together to form a protein molecule.

Their "guinea pig" was the tobacco mosaic virus, a living, rod-shaped particle about a hundred-thousandth of an inch long.

The virus consists of two major parts: a core of nucleic acid and an overcoat of protein. The protein overcoat is composed of about 2,200 identical protein molecules, each of which contains a single chain of 158 amino acid units.

Six months ago two members of the Berkeley team, Dr. Akira Tsugita and Dr. Heinz L. Fraenkel-Conrat, reported that a detectable change had occurred in the amino acid unit third from the bottom in the 158-link protein chain. The change was a result of a chemically caused mutation, or heredity alteration.

Pinpointing of this change provided a landmark in the long chain and allowed the researchers to determine what chemical unit followed the landmark and what chemical unit preceded it, until the entire sequence was known.

The discovery marks the first complete analysis of the amino acid sequence in a virus protein, the largest protein of any kind and the largest genetically governed molecule ever analyzed.

Sharing in the discovery, reported in the Proceedings of the National Academy of Sciences, Nov. 1960, were Nobelist Dr. Wendell M. Stanley, Drs. Janis D. Young and C. Arthur Knight, and Dr. Duane T. Gish, now of Upjohn Research Laboratory, Kalamazoo, Mich.

• Science News Letter, 78:342 November 26, 1960

BIOCHEMISTRY

Silicon-Based Life Possible

➤ LIFE FORMS containing silicon instead of carbon are possible—but not on earth, six scientists from the University of Pennsylvania reported to the National Academy of Sciences meeting in Philadelphia.

Their suggestions of a silicon-based life somewhere in the universe results from the fact that the chemical and physical properties of life-essential carbon and its compounds are more similar to the chemical and physical properties of silicon and its compounds than to those of any other elements.

Carbon is the chemical basis of earth life. All known living substances on earth contain both simple and complex carbon compounds.

The scientists have prepared, for the first time, silicon compounds that structurally are the exact counterparts of carbon compounds.

By comparing the silicon compounds with their carbon doubles, the scientists hope to be able to discover "how and why carbon and silicon compounds are similar to, or different from, each other," and thus discover more about the properties of the abundant silicon element and its compounds.

Silicon makes up one-quarter of the earth's crust; but little is known about its simple compounds, the scientists said. It is an essential constituent of all rocks and sand. Sand, for example, consists chiefly of silicon dioxide, a compound of silicon and oxygen.

The life-essential element of carbon, although it accounts for only one ten-thousandth of the earth's crust, has been studied extensively.

At the present time, knowledge of silicon compounds is 150 years behind the carbon studies, they said.

If a silicon-based life exists in the universe, it would have to originate on a planet having an entirely different composition from that of earth, one without oxygen, for instance, the scientists reported. The "life" too would be different and would compare with what we know to be life on earth only in growing and carrying out metabolic functions. Such living "things" could not exist, therefore, in the earth's atmosphere.

The silicon studies were made by M. Abedini, A. D. Craig, A. G. MacDiarmid, B. Sternbach, J. V. Urenovitch, and L. G. L. Ward of the University of Pennsylvania chemistry department.

• Science News Letter, 78:342 November 26, 1960

Do You Know

In both children and adults, the *weight* should be carried on the heels; many adult problems come from placing too much weight on the balls and toes of the feet.

Production of liquid carbon dioxide, an easily controlled industrial *refrigerant*, has nearly doubled, while output of the harder-to-handle dry ice has dropped off.

About 70,000 people are hospitalized for *burns* each year in the United States.

The daily national supply of *water* is 315 billion gallons; the demand amounts to a little more than 320 billion gallons a day.

George Washington's first national *budget* was written on a single sheet of paper; the current Eisenhower budget runs to 1,030 pages.

• Science News Letter, 78:342 November 26, 1960

BIOCHEMISTRY—GEOLOGY

Life Universally the Same

➤ LIFE IS LIKELY to be the same anywhere in the universe because all living organisms are most probably made up of the same four elements: carbon, oxygen, nitrogen and hydrogen.

Only these four elements have suitable properties for sustaining life, Dr. George Wald, biology professor at Harvard University, told the American Philosophical Society in Philadelphia.

He said that it is doubtful if life can arise without water or progress very far without oxygen. Nor is it likely that life can exist anywhere without radiation—such as the radiation the earth receives from the sun that excites molecules electronically and so activates photochemical reactions.

Therefore, it is possible to consider universal physical relationships, Dr. Wald said. The relationships in the periodic system of the elements may be assumed true everywhere in the universe; so also the laws of chemical combinations and dissolution; and the effects of temperature, pressure and radiation on the rates of chemical reaction.

It may be possible to discover the widespread association of certain types of organic molecule with special functions in organisms, by studying the evolution on earth, Dr. Wald said.

When widely separated groups of living organisms independently select the same type of molecule for the same function, they may as well be on different planets. There are examples to show that such independent choices have been made on earth, and they are governed, not by availability, but by suitability.

These considerations are of general interest, but, in addition, they open up a new frontier of universal biochemistry, Dr. Wald said.

• Science News Letter, 78:343 November 26, 1960

History From Sediment

➤ SEDIMENT from the bottom of a small lake north of Rome has provided scientists with a history of events dating back as much as 25,000 years ago.

Prof. G. Evelyn Hutchinson, Yale University zoologist, reported to the American Philosophical Society meeting in Philadelphia results of an intensive pollen analysis she made with Dr. Ursula Cowgill of two three-meter cores taken from the bottom of Lake Monterosi.

The deepest layer of the sediment was laid down, Prof. Hutchinson reported, in the interstadial between the second and third episodes of the Wurm glaciation, an event dated by geologists as in the neighborhood of 25,000 years ago. At that time, the pollen analysis indicated, the surrounding country was practically treeless and tundralike.

A species of Artemisia, a genus that includes the sagebrush and shrubs of the aster family, was the principal pollen producer at that time.

After about a third of the sediment had been deposited, a pioneer hazel community developed, followed by fir and then mixed oak forest.

In the top quarter of the core, the scientists found plantago pollen, giving evidence of agriculture in a region archaeologists believed to have been uninhabited at that time.

• Science News Letter, 78:343 November 26, 1960

ENTOMOLOGY

Spider-Eating Fly Reverses Common Order

➤ A SPIDER that eats flies is no news, but a fly that eats spiders is worth attention and is getting lots of it, a book-full, from the Smithsonian Institution, Washington, D. C.

The attention-getting insects are the acrocerids, two-winged flies with very small heads, that pass the larval stage of their lives inside spiders, devouring the tissues of their hosts, without any obvious awareness on the part of the doomed spiders, which keep spinning webs to catch flies.

How the fly gets into the spider is not known. But once a fly eats its way out, it leads a normal adult existence, presumably even getting caught by spiders.

A book revising the largest genus of these odd insects, the Ogcodes, has been written by Dr. Evert L. Schlinger of the University of California, published by the Institution. It contains descriptions of 78 species of these creatures, 14 of them new.

The spider-eating flies are essentially world-wide in distribution, although little known, and rarely a collector's item except for spiders.

• Science News Letter, 78:343 November 26, 1960

BIOLOGY

"Living Light" Crystallized

➤ THE "LIVING LIGHT" chemical, luciferin, which makes a glowworm glow, has been crystallized from a glowing South Pacific fish known in Japan as kinme modoki by a Princeton biologist and two Japanese colleagues.

Bioluminescence, sometimes called "living light" or "cold light," occurs in many marine dwellers, including luminous bacteria that may live in or on a fish, making the host appear luminescent.

Glowing land dwellers include a spider found only in the High Sierras and a rare luminous beetle. Perhaps the weirdest creature of all is the "railroad worm," which has evenly spaced yellow lights down either side of its body and a red light out front.

Recent studies of luminescent systems in living organisms have clarified biological processes in general, Dr. Frank Harris Johnson, biology professor at Princeton University, said. Changes in the intensity of "living light" emitted in response to variations in heat, cold, pressure and chemicals can be measured easily.

Since the chemical processes of luminescence are basically similar to those that control reactions in living cells generally, their study has helped to show how other cells can be expected to behave in various circumstances. With pure luciferin now available, the same system can be studied under simpler, more easily controlled conditions than would be possible inside a living organism.

Citing one of many examples, Dr. Johnson said experiments with luciferin, which reacts to enzymes, could indicate basic aspects of how human cells react to narcotics, anesthetics, analgesics and antibiotics.

Dr. Johnson and Dr. Yata Haneda of Tokyo's Jikeika Medical College separated kinme modoki luciferin compound in 1957 in Japan.

Dr. O. Shimomura isolated luciferin from the cypridina or "sea firefly" in 1957. Dr. Shimomura, a Fulbright scholar, is now with Dr. Johnson as research associate.

Dr. W. D. McElroy, director of the McCollum-Pratt Institute at Johns Hopkins University but formerly a Princeton student, isolated luciferin from the firefly in 1957. Drs. Johnson, Haneda and Shimomura dissected more than 4,000 of the luminous organs of kinme modoki and crystallized the pure chemical.

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BUILT-IN LIGHT—The lantern-bearing sea-devil, Melanocetus johnsoni, *carrying a light in front of its mouth, is one of the luminescent fishes shown as a model in an exhibit of deep-sea fishes, opening Dec. 1 at the Cranbrook Institute of Science, Bloomfield Hills, Mich.*

GENERAL SCIENCE

Translate Russian Papers for U. S. Scientists

➤ RUSSIAN SCIENTIFIC and technical publications have been translated in Israel under United States Government contract. They were paid for with money Israel spent on U. S. farm surpluses—money the United States had agreed to spend in Israel.

The U. S. also has translation projects underway in Poland and Yugoslavia. The three programs will provide 89,000 pages of material originally published in languages unfamiliar to American scientists. The contracts were made by the National Science Foundation. The Department of Commerce will sell the translations for about one cent a page.

• Science News Letter, 78:344 November 26, 1960

PHYSIOLOGY

Fat Women Less Active Than Fat Men

➤ FAT WOMEN are even more easy-going and more inactive, physically, than fat men, Drs. Anna-Marie Chirico and Albert J. Stunkard of the University of Pennsylvania School of Medicine, Philadelphia, report.

They matched the physical activity and mental attitude toward activity of 25 obese men and 15 obese women against their non-obese counterparts in age, occupation and socioeconomic background.

Daily activity measured by a mechanical pedometer showed that obese women walked an average of 2.0 miles per day as compared with 4.9 miles per day for non-obese women. Comparable figures for men were 3.7 and 6.0 miles per day.

At the same time fat women were much more passive, when compared to normal-weight women, than were fat men compared to normal-weight men.

The physicians conclude in the New England Journal of Medicine, 263:935, 1960, that "the physical activity of many obese women is so severely limited that even small increases might favorably alter caloric balance."

Decreased physical activity may play a a part in the obesity of women, but it appears to be less important in that of men.

• Science News Letter, 78:344 November 26, 1960

PUBLIC HEALTH

Self-Dosing and Fad Diets Can Have Harmful Effects

➤ HARMFUL EFFECTS of liquid formula diets and of self-dosing with vitamins A and D were stressed by Dr. Stanley A. Tauber of the Albert Einstein Medical Center, Philadelphia.

Dr. Tauber also cautioned against acceptance of statistics supporting the low-cholesterol, or fat-free diets, or those high in unsaturated fats sometimes recommended in treatment of hypertension or arteriosclerosis.

Long-range effects that such major changes in diet might have on the body's metabolism should be considered by physicians, he told the American College of Gastroenterology meeting in Philadelphia.

Such unrealistic dietary practices as limiting water or salt intake purely for the purpose of reducing weight in an otherwise healthy person defeat the most important aim of nutritional therapy.

"It is unlikely," he said, "that a patient who loses weight on a liquid diet will then . . . suddenly and miraculously begin to eat a normal, wholesome, well-balanced diet and maintain the weight loss."

Dr. Tauber said the patient may suffer harmful effects of repeated alternating gains and losses of weight from going on and off the liquid diet. Even though the purely liquid formula may be nutritionally adequate, doctors should not condone these fad diets, he warned.

Although standard multivitamin preparations on the market today do not contain excessive quantities of any particular vitamin, there are individual vitamins such as A and D on the market in capsules of 50,000 units or more. Both these vitamins, he said, can produce toxic effects if taken without medical supervision in large enough doses over a long period of time.

• Science News Letter, 78:344 November 26, 1960

AERONAUTICS

Military Computer For Airborne Use

➤ A FAST MILITARY COMPUTER has been developed for airborne use. It occupies only six and a half cubic feet, or the equivalent of a table-model television set, and is completely transistorized.

The speedy new data processor has application to "fire control, space guidance, navigation and electronic counter measures control," Dr. Patrick Conley of Westinghouse Electric Corporation's air arm division in Baltimore, Md., said.

Applied to multiple target-tracking systems, the computer would take the information provided by radar or some other "sensing device," correlate the information and interpret it for use by a weapon system.

• Science News Letter, 78:344 November 26, 1960

NUTRITION

Nigerians' Nutrition Improved by Peanuts

➤ DIETERS in the United States try to cut out in-between-meal snacks of rich foods such as peanuts, but a nutritionist at Cornell University in Ithaca, N. Y., has just returned from Nigeria, where she spent a year encouraging peanut snacks.

Working among the 18,000 natives of Awo Omamma, Nigeria, Prof. Hazel M. Hauck sought an inexpensive protein booster for the ill-fed people. She learned skinned peanuts and cowpeas were enjoyed as snacks and were cheap.

So she taught the natives to buy the nuts green, roast them and eat them in greater quantity with the riboflavin-rich skins on. She also developed a way to use peanuts and cowpeas in soup.

• Science News Letter, 78:344 November 26, 1960

IN SCIEN

PHARMACOLOGY

Anesthetic Mouthwash Better Than Penicillin

➤ CHLORASEPTIC, a new anesthetic mouthwash, has been reported more effective than penicillin after studies at the Veterans Administration Hospital in Tuskegee, Ala., and at Howard University in Washington, D. C. It is used as a gargle for throat infections as well as for pain following dental extractions.

The chemical constituents of Chloraseptic solution are phenol (less than 1.4%), sodium phenolate, menthol, thymol, sodium tetraborate, glycerin and chlorophyll. The action is derived primarily from the phenolic salts, researchers say.

Dr. Bertram Blum, associate visiting oral surgeon, City Hospital, Elmhurst, N. Y., said in the New York State Dental Journal, Nov. 1960, that he found no side effects when using Chloraseptic.

He said the mouthwash is successful in relieving postoperative discomfort in 97% of 175 dental patients studied.

• Science News Letter, 78:344 November 26, 1960

ROCKETS AND MISSILES

Radars Used to Study Hypervelocity Missiles

➤ RADAR TRACKING of a speeding object's re-entry into the earth's atmosphere is being studied using six-stage rockets fired from Wallops Island, Va. Three stages are used to hurl a space vehicle to nearly 200 miles, the other three send it earthward.

Dr. Glen F. Pippert of Massachusetts Institute of Technology's Lincoln Laboratory reported on research aimed at solving problems of defense against ballistic missiles and improving methods of locating and communicating with homeward-bound space vehicles.

When the five-inch sphere carried in the space vehicle is rocketed earthward, it attains hypervelocities. The sphere leaves in its wake a fiery trail of electrified gases for the scientists to probe and test with radar and optical devices.

When an object with hypervelocity re-enters the atmosphere, the air is heated to between 5,000 and 10,000 degrees centigrade. (The sun's temperature is 6,000 degrees at the visible surface.) An ionized gaseous sheath is formed and left in the object's wake. This plasma is being probed and tested as part of the Lincoln Laboratory's re-entry research, Dr. Pippert reported to the Northeast Electronics Research and Engineering meeting in Boston.

All known communication, detection and tracking techniques are affected by the drastic changes that occur when a vehicle from space re-enters the atmosphere.

• Science News Letter, 78:344 November 26, 1960

E FIELDS

PHYSIOLOGY

Menstruating Women Found Accident-Prone

➤ WOMEN ARE MORE accident-prone during menstruation and the four days preceding, Dr. Katharina Dalton of University College Hospital, London, England, has found.

Of 84 regularly menstruating women involved in accidents, 44 (52%) were in the premenstrual or menstrual phase of the monthly cycle, her study showed.

Staying at home during the "dangerous" days has little or no effect on cutting down the chances of accident. Just as many injuries occurred at home as on the job or while traveling.

Even if a woman is not directly the cause of an accident, she is still more likely to be injured as an innocent bystander during the few days she is menstruating, Dr. Dalton reports in the British Medical Journal, Nov. 12, 1960.

Previous studies show that women are more lethargic and slower to react during menstruation and the premenstrual period. They are more forgetful and tend to be less punctual. Intelligence test scores drop during this period, but mechanical performance and practical judgment are not influenced.

Dr. Dalton also found that women who have had an artificial menopause, such as hysterectomy, are more accident-prone than those whose menopause was natural.

As a result of her study, the doctor questions the wisdom of giving tranquilizers for premenstrual tension, a practice that may increase accident-proneness at the "most dangerous time of the menstrual cycle."

• Science News Letter, 78:345 November 26, 1960

TECHNOLOGY

Eavesdropping Doomed By "Security Phones"

➤ A PORTABLE ELECTRONIC VOICE scrambler used with a standard telephone system can prevent listening in, but the cost of privacy is high.

"Security Telephones" (patent pending), used in pairs and costing over $200, can assure absolute privacy even if your phone is part of a party-line, a series of extension phones or is connected to a switchboard whose operator is curious.

The telephone security unit was on display in Washington, D. C., at the 67th annual conference of the International Association of Chiefs of Police. It converts the human voice into incoherent jargon that cannot be understood unless restored to normal speech by means of a second security instrument. The second instrument, attached to the earphone of the listener, unscrambles the voice message.

An advantage of the security system is that it is always ready for immediate use because it is transistorized and transistors do not require a "warm-up" period.

A unique feature is the handle, which permits it and the telephone to be held by one hand. Because it is portable, the unit can be used on pay phones, private phone and hotel phones without attracting attention. No electrical connection is required. And it can be used for long distance.

The security telephones are paired by code and only when two phones are coded alike can conversations be understood. The system also makes it impossible for a third party to identify the voices of the speakers using it.

Predictions are that widespread use of the security phones will frustrate the "party-line eavesdropper" and take away from the company switchboard operator her now secure title of "best-informed."

• Science News Letter, 78:345 November 26, 1960

NUTRITION

Cheaper, Better Food In U. S. Than Elsewhere

➤ THE AVERAGE American family is eating more good food for less money than are families elsewhere in the world, research at Cornell University, Ithaca, N. Y., shows.

Prof. Herrell DeGraff of the Graduate School of Nutrition at the university reported that the typical family of the world spends 60% of its productive efforts for food. In the United States the typical family gets a better diet for less than a quarter of its disposable income. The food supply in the U. S. is superior because great scientific contributions have been made in food production, processing and distribution.

• Science News Letter, 78:345 November 26, 1960

EDUCATION

U. S. Education Office Aids Science Career Planning

➤ TO BECOME a space scientist or a weather expert, take all the high school science you can get, plus lots of college chemistry or physics or both.

This advice comes from the Bureau of Labor Statistics and the U. S. Office of Education in a free pamphlet for students, "Science and Your Career."

Science careers requiring various amounts and kinds of high school, vocational school, college or postgraduate training are listed in this pamphlet, which is designed to encourage students to make informed and adequate plans for their education and future careers. Specific reference is made in each case to detailed information presented in the U. S. Department of Labor's "Occupational Outlook Handbook" and in reprints covering each career specialty.

Reprint leaflets on such fields as architecture, chemistry, dietetics, sheet metal work, physics, printing, teaching, etc., are available at prices ranging from five to twenty cents a copy from the Superintendent of Documents, Washington 25, D. C.

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PSYCHOLOGY

Sight of Artificial Mother Rewards Ducklings

➤ SIGHT OF an artificial substitute mother can be used in place of food or water as a reward when teaching ducklings, Dr. Neil Peterson, Harward University psychologist, reports in Science, 132:1395, 1960.

He found that after ducklings had learned to follow a moving yellow cylinder during the impressionable early hours of life, a type of learning called imprinting, they could be taught to peck on a Plexiglas key when rewarded by a sight of the yellow cylinder "mother."

In one experiment, the ducklings were rewarded after ten pecks when the key was lighted. In a second experiment the key was dark and the ducklings were rewarded only after they had not pecked at the key for a minute. After four hours of training on these two experiments, the ducklings learned to peck at the key only when it was lighted and stay away from it when it was dark.

• Science News Letter, 78:345 November 26, 1960

AERONAUTICS

Jet Noise Can Produce Cracks in Plane's Metal

➤ JET NOISE, which irritates passengers and persons on the ground, can also produce cracks in a plane's metal skin.

This problem is being studied intensively by an engineering professor at the University of California, Los Angeles, as a basic first step in overcoming the problem.

After the propulsive jet of gas has left the engine, it fans out and mixes with the atmosphere, creating violent turbulent eddies that radiate sound waves, says Prof. Alan Powell, who is investigating aerodynamic noise in a special laboratory on campus.

For present jet airliners, the impact of the noise and accompanying vibrations is strongest on the flaps and then on the middle-rear part of the fuselage. The latter fact is one reason that the first class compartment in jet planes has been switched to the forward part of the plane.

So far, sound-induced vibrations that cause acoustic fatigue have not caused any major accidents, but they have resulted in numerous cracks in the plane's metal skin and the loosening of rivets. As jet engines become more powerful, the problem will grow increasingly important, says Prof. Powell, who started his research ten years ago in his native England.

Since the jet noise level depends more on the velocity of the jet stream than on its diameter, Prof. Powell hopes to see the introduction of engines having larger but slower jet streams, which could give the same thrust with less noise.

In the future, Prof. Powell believes, the noise factor must be taken into account in the preliminary design of a plane and its engines, and not after the first cracks show up or passengers start complaining.

• Science News Letter, 78:345 November 26, 1960

ASTRONOMY

Venus and Mars Now Prominent

Venus and Mars are the brightest planets in December. Mars is bright because it approaches earth. Venus, Saturn and Jupiter set early in the evening, James Stokley reports.

➤ LOOK TOWARD the western sky these evenings, soon after the sun has gone below the horizon. Long before it is dark, and other stars and planets have appeared, you will see Venus shining brilliantly in the southwest.

Because it sets in early December about three hours after the sun, Venus is not shown on the accompanying maps. (These give the appearance of the skies about ten p.m., your own kind of standard time at the beginning of December; an hour earlier at the middle of the month and two hours earlier at the end.) Its approximate position in the closing days of the month is indicated by a letter V in a circle.

➤ Our second bright planet, however, is visible practically all night. This is Mars, whose position is shown in the constellation of Gemini, the twins, toward the east. This is a region of many bright stars, but Mars is brighter than most of them. Its red color and steady light, so different from the twinkling stars, make it easy to identify.

Jupiter, which was so prominent in the evening sky earlier in the year, sets about an hour and a half after the sun at the beginning of December. Perhaps you can get a glimpse of it very low in the southwest soon after sunset. Saturn also is in that direction. It remains visible a little longer, setting, around the first week of December, about an hour ahead of Venus. It is considerably fainter than either Venus or Jupiter, so it is more difficult to locate.

Sirius Fainter Than Venus

Among the stars of December evenings the brightest is Sirius, part of Canis Major, the great dog, over in the southeast. It is somewhat brighter than Mars, but considerably fainter than Venus. Above Sirius shines the brilliant constellation of Orion, the warrior, in which there are two stars bright enough to rank as first magnitude on the astronomical scale of brilliance. Betelgeuse is above, Rigel below; between them are the three fainter stars in a row that form Orion's belt, as he was pictured on the old star maps.

Still higher you can see Taurus, the bull, with another first-magnitude star, Aldebaran. Toward the left stands Auriga, the charioteer, with Capella, which is about as bright. Descending from Auriga you come to Gemini, the twins, where Mars is now located. This contains two bright stars, both fainter than the planet. Pollux, the brighter, is first magnitude; Castor, the other, is second. And between Pollux and Sirius is the lesser dog, Canis Minor, with the star named Procyon.

And low in the northwest our maps show a star called Vega. This is in Lyra, the lyre, and it is also of the first magnitude. However, at present it stands so close to the horizon that it is dimmed greatly by the added thickness of air through which its light has to travel.

Mars is now so bright because it is making one of its regular approaches to earth, as it does every 780 days. On Christmas day it will be nearest—56,370,000 miles away. It came closer the last time (Nov. 16, 1958). The time before that (Sept. 10, 1956) it was still closer, its distance a little more than 35 million miles from earth. Under optimum conditions, it can approach to a minimum of 34,500,000 miles. Its next very close visit will come in early August, 1971, when it will be about 35 million miles away.

Even when closest, Mars is about 160 times as far away as the moon. A typical pair of binoculars will magnify six diameters, that is, they will apparently bring a distant object to within a sixth of its actual distance. Six times 160 is 960, and this is about the highest magnification that can be used ordinarily, even with a big telescope under good conditions. Thus Mars through a large telescope looks as close as the moon does through binoculars.

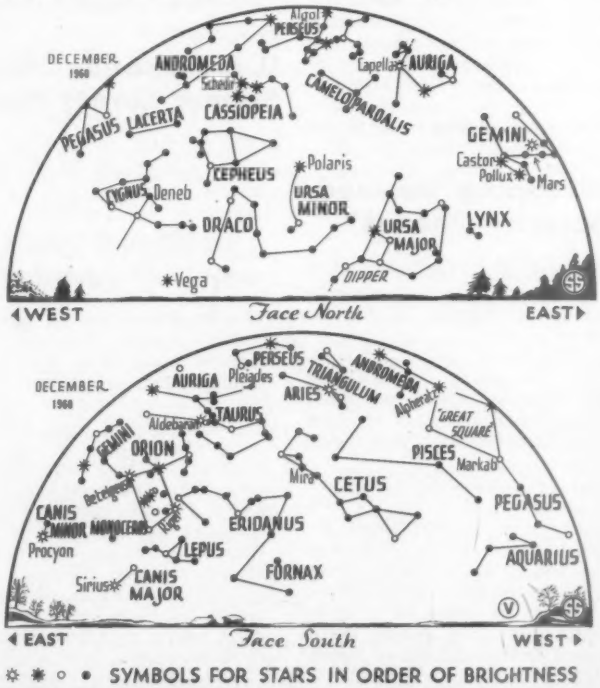
However, there are definite and permanent markings on Mars, which can be detected through even moderate-size telescopes. These dark markings cover about a third of the Martian surface, while about two-thirds is bright orange in color. This is what gives Mars its characteristic red color.

Perhaps the light regions are desert areas covered wtih sand or dust. This may contain iron oxide, or iron rust, which is red. There is very little oxygen in the present atmosphere of Mars. It may have been more abundant in the past, but now has entered into chemical combination with other elements to form oxides—that is, Mars may literally have rusted.

When Mars made a close approach in 1877, an Italian astronomer named Schiaparelli thought he could observe a network of thin dark lines covering the light regions. He called them "canali," which is Italian for "channels." Unfortunately, the word was translated into English as "canals;" this suggests an artificial origin, which "channels" does not.

Mars Canals Argued

An American astronomer named Lowell, from his private observatory in Arizona, later reported that these canals extended across the dark areas, proving that they were not bodies of water. Moreover, he argued, the canals were so straight that no natural process could have formed them; therefore they must be of artificial origin. This was the basis of his contention that Mars is inhabited by a race of highly intelligent beings.



Other astronomers, however, were unable to see the canals as Lowell did. Now it seems that they are dark patches, roughly aligned. Even under the best conditions, we cannot see them very clearly, and they seem to be joined to form the fine lines that Schiaparelli and Lowell reported.

This seems to have been confirmed in 1948 when Dr. Audouin Dollfuss, a French astronomer, was observing Mars with a large telescope at the observatory on the Pic du Midi, in the Pyrenees in southern France. This location is blessed with extraordinarily fine seeing conditions.

Under their usual conditions, probably better than the best at most observatories, he saw many "canals." But on a few occasions, he said, the seeing was not merely "good;" it was "perfect!" The lines then broke up into smaller spots and patches. Then would come a slight tremor of the atmosphere, and the spots would join together again into straight lines.

Just why such spots should be roughly aligned is a puzzle, which probably will not be solved until Mars can be observed much more closely than it can from the surface of the earth.

Celestial Time Table for December

Dec.	EST	
2	11:25 p.m.	Full moon
3	1:39 a.m.	Algol (variable star in Perseus) at minimum brightness
5	10:28 p.m.	Algol (variable star in Perseus) at minimum brightness
6	1:00 a.m.	Moon passes south of Mars
	10:00 p.m.	Moon farthest; distance 252,100 miles
8	7:17 p.m.	Algol at minimum
11	4:39 a.m.	Moon in last quarter
13	early a.m.	Meteors visible apparently emanating from constellation of Gemini
18	5:47 a.m.	New moon
19	6:00 a.m.	Moon nearest, distance 222,800 miles
	5:00 p.m.	Moon passes north of Saturn
21	10:00 a.m.	Moon passes north of Venus
	3:27 p.m.	Sun farthest south — winter solstice—winter commences in Northern Hemisphere
23	3:23 a.m.	Algol at minimum
24	9:30 p.m.	Moon in first quarter
25	1:00 a.m.	Mars nearest earth, distance 56,370,000 miles
26	12:12 a.m.	Algol at minimum
28	9:01 p.m.	Algol at minimum
30	5:00 a.m.	Mars in opposite direction from sun.

Subtract one hour for CST, two hours for MST, and three for PST.

• Science News Letter, 78:346 November 26, 1960

Questions

BIOCHEMISTRY—How many protein molecules make up the protein "overcoat" of the tobacco mosaic virus? p. 342.

BIOLOGY—Which aspects of human cell reactions could experiments with luciferin show? p. 343.

GEOPHYSICS—What effect did the recent solar storm have on the orbital time of satellites? p. 339.

Photographs: Cover, U. S. Navy; p. 339, National Bureau of Standards; p. 341, Pratt and Whitney Aircraft; p. 343, Cranbrook Institute of Science; p. 350, D. Cerrado, Inc.

• Books of the Week •

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

ABOUT CHEMISTRY—Magnus Pyke—*Macmillan*, 219 p., illus., $4.50. Helps the layman understand what chemistry is, how it works, and how man puts it to practical use.

BEGINNING SCIENCE WITH MR. WIZARD, Four Books: Flying. Heat. Light. Water—Don Herbert and Hi Ruchlis—*Doubleday*, 32 p. each, illus. by Mel Hunter, $1.25 each. Amply illustrated, shows boys and girls how to do the simple experiments Mr. Wizard does on TV.

BEYOND THE PLANET EARTH — Konstantin Tsiolkovsky, transl. from Russian by Kenneth Syers—*Pergamon*, 190 p., $3.75. Russian rocket pioneer's scientific fantasy, written in 1920, with biographical foreword.

BIRD PORTRAITS IN COLOR: 295 North American Species—Thomas S. Roberts, rev. by Walter J. Breckenridge, Dwain W. Warner and Robert W. Dickerman—*Univ. of Minn. Press*, rev. ed., 202 p., 92 color plates by Allan Brooks and others, $5.95. Reference work for amateur bird watchers and ornithologists.

CARIBBEAN STUDIES: A Symposium — Vera Rubin, Ed.—*Univ. of Wash. Press*, 2nd ed., 124 p., map, $3. Papers analyzing the sociocultural complexity of the people in the Caribbean.

THE CHALLENGE OF FUSION—Duncan Curry, III and Bertram R. Newman—*Van Nostrand*, 192 p., illus., $5.50. Answers the layman's questions about controlled thermonuclear power, the principles and immense problems involved, and how it may change our present pattern of life.

COLLEGE CHEMISTRY LABORATORY — M. E. Lash—*Burgess*, 122 p., paper, $2.90. To be used with first semester course in Freshman Chemistry.

THE DIFFUSION OF COUNTING PRACTICES—A. Seidenberg—*Univ. of Calif. Press*, 84 p., illus., maps, paper, $2.50. Study of the spread of pure 2-counting and neo-2-counting among the aborigines of the five continents.

DYNAMICS—Horace Lamb—*Cambridge Univ. Press*, 351 p., paper, $3.75. Reprint.

THE EARTH: Rocks, Minerals and Fossils—W. B. Harland—*Watts, F.*, 255 p., illus. by Paxton Chadwick, $4.95. Profusely illustrated introduction to geology for boys and girls.

ENGINES AND HOW THEY WORK—Geoffrey Boumphrey—*Watts, F.*, 255 p., illus. by J. S. Graham Browne, $4.95. Informs young people about development of engines, from early pumps to gas turbines.

THE FIRST BOOK OF TOOLS: The Story of the 12 Tools of Man—Gene Liberty—*Watts, F.*, 62 p., illus. by R. Mayhew, $1.95. Shows children the basic types of tools, ancient and modern.

FROM DUALISM TO UNITY IN QUANTUM PHYSICS — Alfred Lande — *Cambridge Univ. Press*, 114 p., $3.75. Reduces the dualistic quantum phenomena to elementary general principles of symmetry, invariance, continuity and the like.

HANDBOOK OF RESEARCH METHODS IN CHILD DEVELOPMENT—Paul H. Mussen, Ed.—*Wiley*, 1061 p., illus., $15.25. Comprehensive coverage of research methodology, addressed to investigators and graduate students of child study techniques.

HIGH SCHOOL MATHEMATICS, (Units 1-4). 1: The Arithmetic of Real Numbers. 2: Generalizations and Algebraic Manipulation. 3: Equations and Inequations. 4: Ordered Pairs and Graphs—University of Illinois Committee on School Mathematics—*Univ. of Ill. Press*, rev. ed., 141 p., 158 p., 197 p., 131 p., paper, teachers' edition $6; students' $2.25.

A HISTORY OF THE THEORIES OF AETHER AND ELECTRICITY, Vol. I: The Classical Theories. Vol. II: The Modern Theories—Sir Edmund Whittaker—*Harper*, 434 p., 319 p., paper, Vol. I: $1.95; Vol. II: $1.85. Reprint, originally published in 1951 and 1953.

HOME CARPENTRY HANDBOOK—R. J. DeCristoro—*Fawcett*, 144 p., illus., $2.50; paper 75¢. Guide for the home workshop.

HUSBANDS & WIVES: The Dynamics of Married Living—Robert O. Blood, Jr. and Donald M. Wolfe—*Free Press*, 293 p., $5. Sociological study based primarily on interviews with wives in metropolitan Detroit.

THE IMPACT OF EDUCATIONAL TELEVISION—Wilbur Schramm, Ed.—*Univ. of Ill. Press*, 247 p., $5. Selected studies from research sponsored by the National Educational Television and Radio Center.

INFRARED METHODS: Principles and Applications—G. K. T. Conn and D. G. Avery—*Academic*, 203 p., illus., $6.80 Principles of the chief components used in exploring the infrared region, and their practical applications.

ISOTOPE EFFECTS ON REACTION RATES—Lars Melander—*Ronald*, 181 p., $6. Presents briefly the main principles of kinetic isotope effects.

ISOTOPES—J. L. Putman—*Penguin*, 232 p., illus., paper, $1.95. Tells how atoms and their radiations are used by man.

THE QUEST OF LOUIS PASTEUR—Patricia Lauber—*Garden City Bks*, 56 p., illus. by Lee J. Ames, $2.50. Biography for children.

SCIENCE CLUBS OF AMERICA SPONSOR HANDBOOK, 1960-61—Leslie Watkins, Ed.—*Science Service*, 64 p., illus., paper, $1. A guide to science club activities, science fairs, projects and scholarship opportunities.

THE SCIENTIFIC AMERICAN BOOK OF PROJECTS FOR THE AMATEUR SCIENTIST—C. L. Stong, introd. by Vannevar Bush—*Simon & Schuster*, 584 p., illus. by Roger Hayward, photographs, $5.95. Experiments and diversions in astronomy, archaeology, biology, nuclear physics, optics and other fields of science.

SEEING COLOURS—J. Bergmans, transl. from Dutch—*Macmillan*, 80 p., color chart, $3. Concise treatment of the theories of color vision.

SUCCESSFUL PREPARATION FOR FCC RADIO OPERATOR LICENSE EXAMINATIONS—Darrell L. Geiger—*Prentice-Hall*, 689 p., diagrams, $9.25. Well-organized guide and useful reference to electronics.

TELEVISION FACTBOOK, Fall-Winter 1960—Paul Stone, Ed.—*Television Digest*, 31st ed., 506 p., map, paper, $5. Indexed reference to stations in U. S. and abroad, program sources, allocations, closed circuit and pay TV.

THERMODYNAMIC TABLES AND OTHER DATA—R. W. Haywood, Ed.—*Cambridge Univ. Press*, 2nd ed., 23 p., paper, 50¢.

VOLCANIC HISTORY OF THE GUATEMALAN HIGHLANDS—Howell Williams—*Univ. of Calif. Press*, 72 p., maps, plates, paper, $2.

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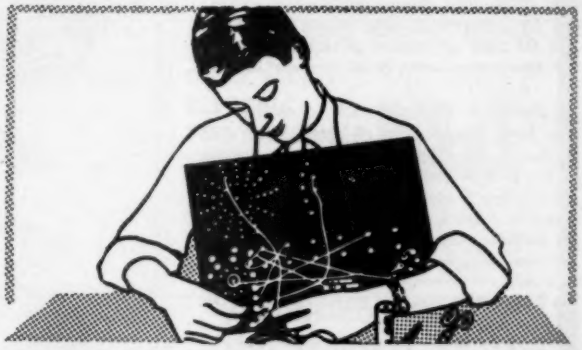

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• Science News Letter, 78:350 November 26, 1960

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• Science News Letter, 78:350 November 26, 1960

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• Science News Letter, 78:350 November 26, 1960

MONEY CLIP, shown in the photograph, has a pen knife blade on one side

and a nail file with a cleaner point on the other. Made of stainless steel, the clip is 2¼ inches by 1 when closed.

• Science News Letter, 78:350 November 26, 1960

ALL-WEATHER COMPACT HAT for snow, rain or sun can be carried like a handbag when not worn. Made of vinyl plastic, it is an umbrella-like hat with two plastic ribbons and a movable sleeve that adjusts it to the chin of the wearer. Affords all-season hair and face protection.

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• Science News Letter, 78:350 November 26, 1960

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• Science News Letter, 78:350 November 26, 1960

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• Science News Letter, 78:350 November 26, 1960

Nature Ramblings

NATURALISTS in watch towers and aerial survey planes are now training their binoculars on the Federal Wildlife Refuge at Aransas, Texas, looking for stragglers from the world's last surviving flock of whooping cranes returning from their summer nesting quarters in Canada.

When the nation was young and wildlife abundant, there were thousands of whoopers. Their breeding grounds, now confined to the Wood Buffalo Park region around Canada's Great Slave Lake, then came as far south as Illinois and Iowa.

In those days, these big marsh dwellers came whooping southward along migration routes that spread from New England to Colorado and Idaho into winter quarters reaching from the Gulf States to central Mexico.

But they were corn stealers, and their large size, four feet tall with a wingspan of more than seven feet, made them an easy target for musket balls and arrows alike. In spite of protective measures begun

The Whoopers Return

in 1916, their numbers dwindled to 14 individuals by 1938, when an all-out effort to save them was initiated.

At the last full count in 1959, there were only 39 whooping cranes in existence, 33 wild and six in captivity.

These birds have become wary of man, and their loud, piercing, trumpeting call seems to echo the alarm of a species in danger of extinction. The whooper's cry can be heard a mile away, a projection feat made possible by a 58-inch-long windpipe, about half of which is coiled away in the keel of the breastbone.

Conservation efforts aimed at protecting the big white birds take considerable time and money, and some persons may wonder whether preserving the whooping cranes is worth while.

Each year nature lovers and tourists visiting the winter refuge in Texas spend an estimated $1,000,000 for the privilege of peering at the cranes through a telescope in a faraway tower. Using this yardstick, each bird has an annual value of nearly $25,000.

As expanding industrial and agricultural developments make it more difficult for city dwellers to find wild things to look at, it seems that cranes, and all wildlife, are worth the cost of their protection. Future generations should be able to experience the human satisfactions that come from knowing the wilderness. —GLORIA BALL

• Science News Letter, 78:350 November 26, 1960

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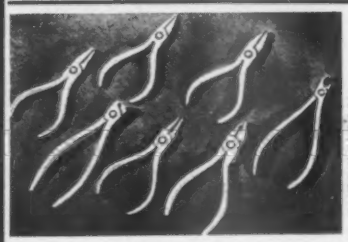

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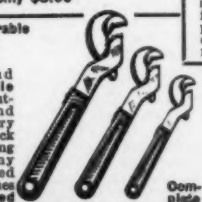

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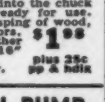

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